Innovative Structural Construction Methods

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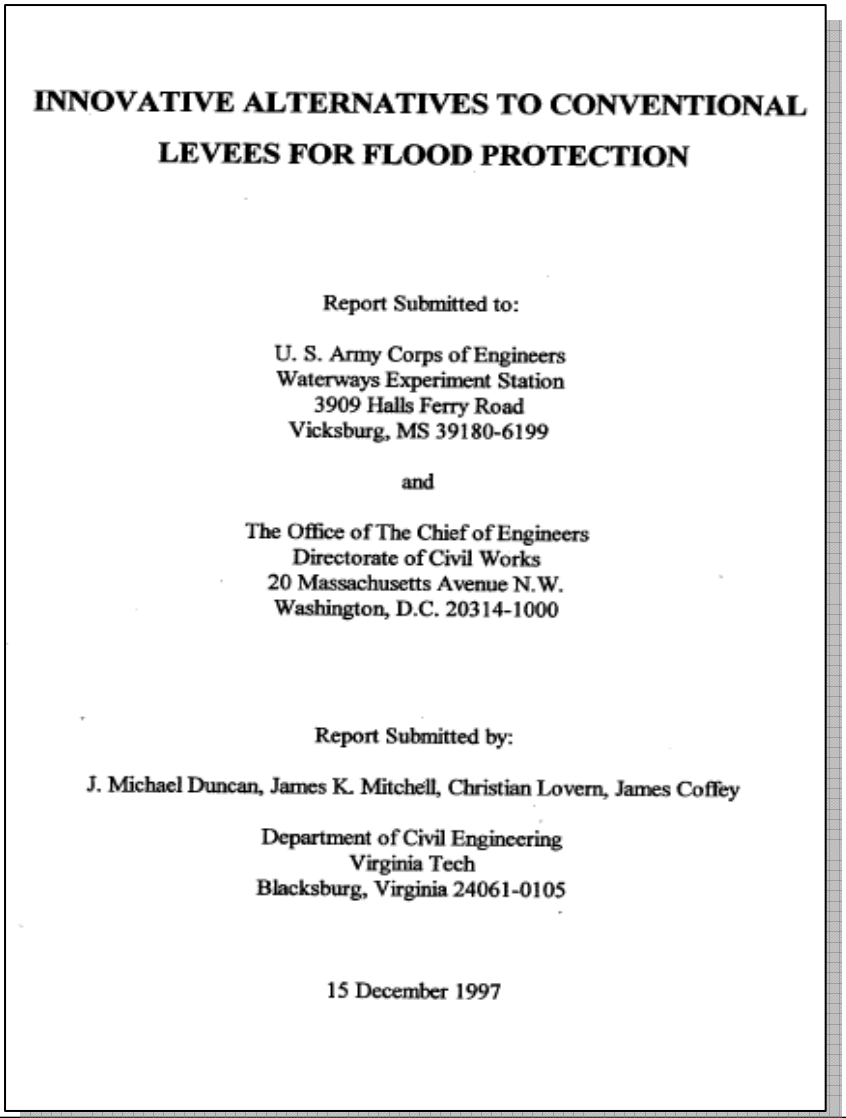

INNOVATIVE ALTERNATIVES TO CONVENTIONAL LEVEES FOR FLOOD PROTECTION

Report Submitted to:

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Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

and

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Directorate of Civil Works
20 Massachusetts Avenue N.W.
Washington, D.C. 20314-1000

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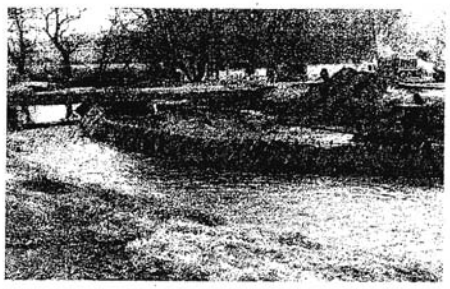
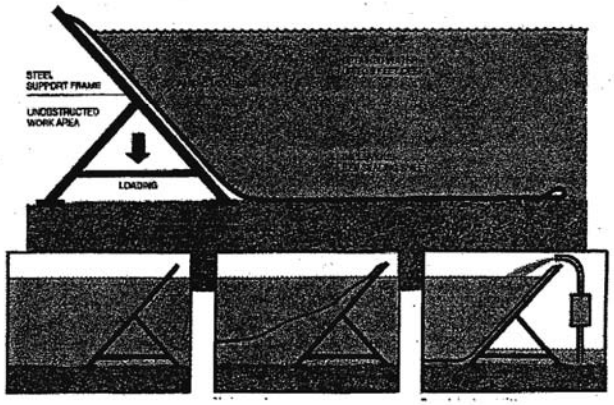
15 December 1997

Portadam

Flood Control Method: **PORTADAM**

Sketch:





Source: Portadam, Inc. Brochure

Lab and Field Tests of 3 Vendor Levee Raising Products + Sand Bags

Portadam

Sand Bags

Hesco Bastion

Rapid Deployment Flood Wall (RDFW)

Portadam During Construction, Field

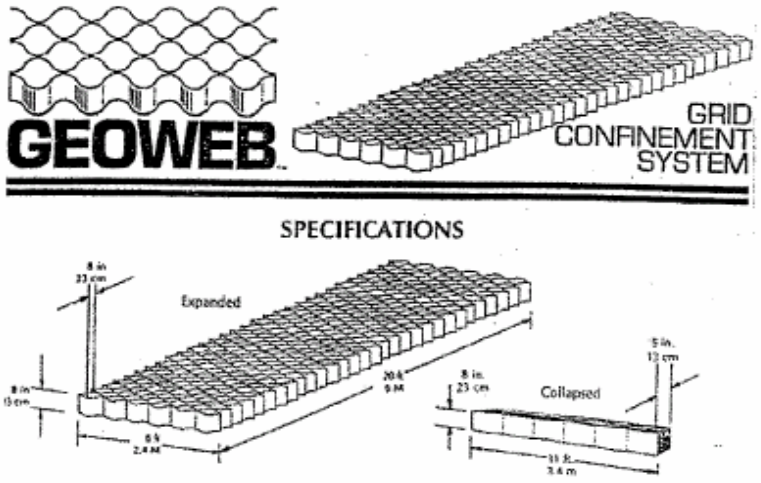
5 people, 4 hours

Portadam After Construction, Field

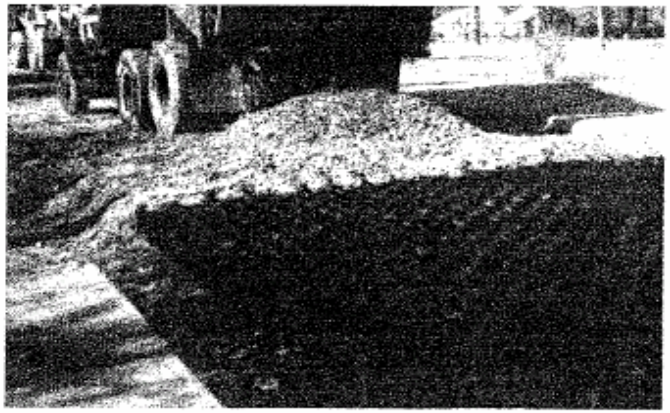
Shallow Cellular Confinement Systems

Flood Control Method: **SHALLOW CELLULAR CONFINEMENT SYSTEMS**

Sketch:



Source: Torrey and Davidson, Fig 2-10



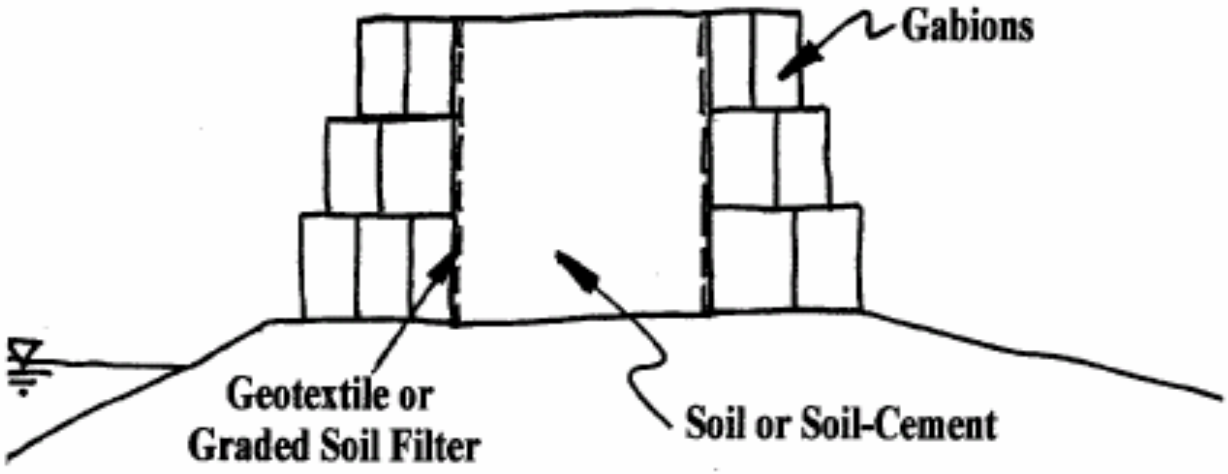
RDFW Construction, Field

6-8 People, 7 hours

Gabion/Earth-Fill Levee

Flood Control Method: **GABION/EARTH-FILL DIKES**

Sketch:



Hesco Bastion Hydrodynamic Test, Laboratory

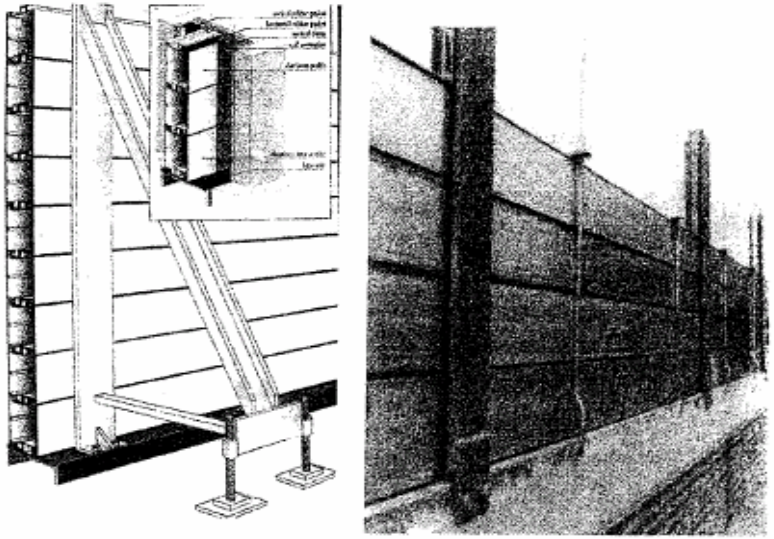
Hesco Bastion During Construction, Field

6-8 people, 7 hours

Aluminum Stop-Log Levee

Flood Control Method: **ALUMINUM STOP-LOG DIKES**

Sketch:



Source: GOH Brochure

Source: http:/www.floodcontrol.com

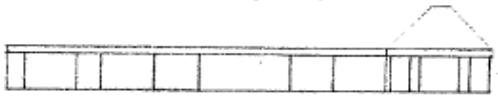
Composite Interlocking Walls

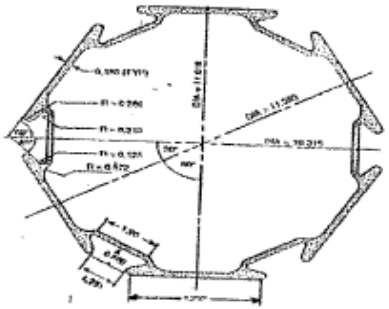
Flood Control Method: **COMPOSITE INTERLOCKING LEVEE WALLS**

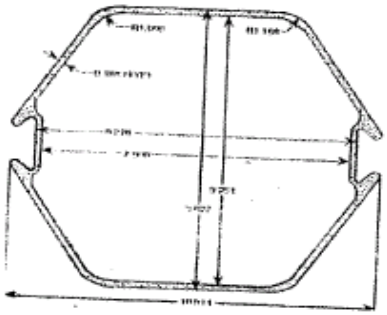
Sketch:

Top view showing two different poles and sheet piling.

Side view showing various cups.







Source: O'Toole and McCombs, 796

Air-Inflatable Rubber Bladders

Flood Control Method: **AIR-INFLATABLE RUBBER BLADDERS**

Sketch:

Photo: Obermeyer Hydro, Inc.

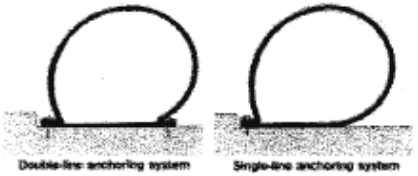
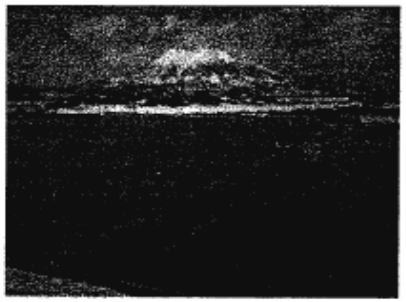


Photo: Atlantic Fluid Technology Associates



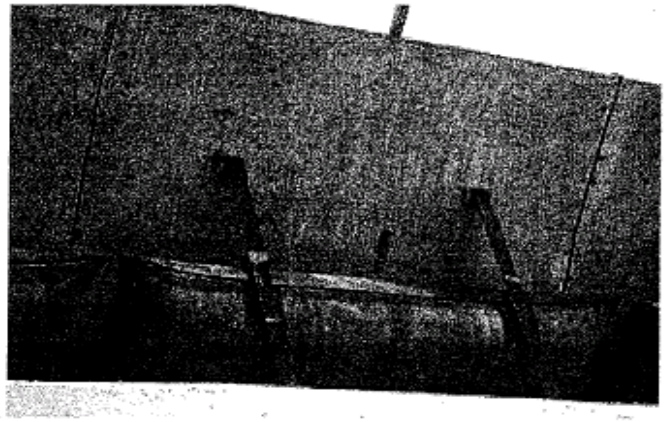
Sumigates used for flood control in Japan

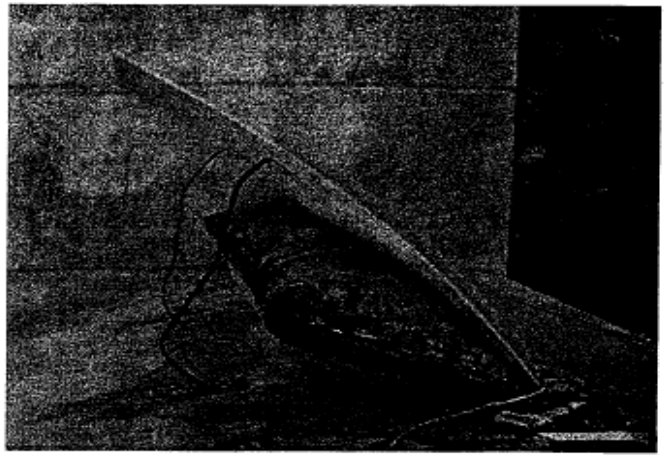
Photo: Rodney Hunt Company

Steel Gate Panels with Air-Inflatable Bladders

Flood Control Method: STEEL GATE PANELS WITH AIR-INFLATABLE BLADDERS

Sketch:



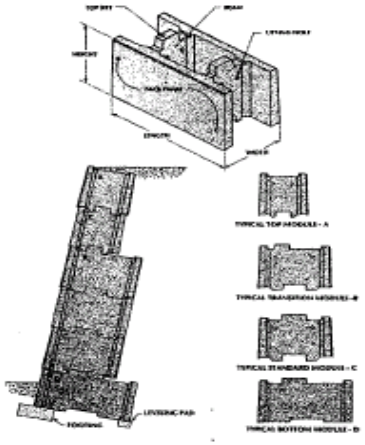


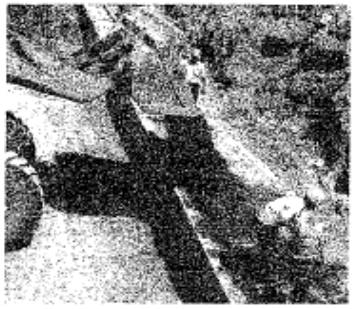
Source: Obermeyer Hydro, Inc.

Modular Retaining Wall Systems

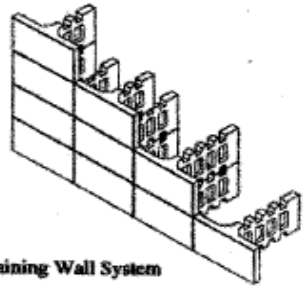
Flood Control Method: **MODULAR RETAINING WALL SYSTEMS**

Sketch:





Source: Doublewal Brochure



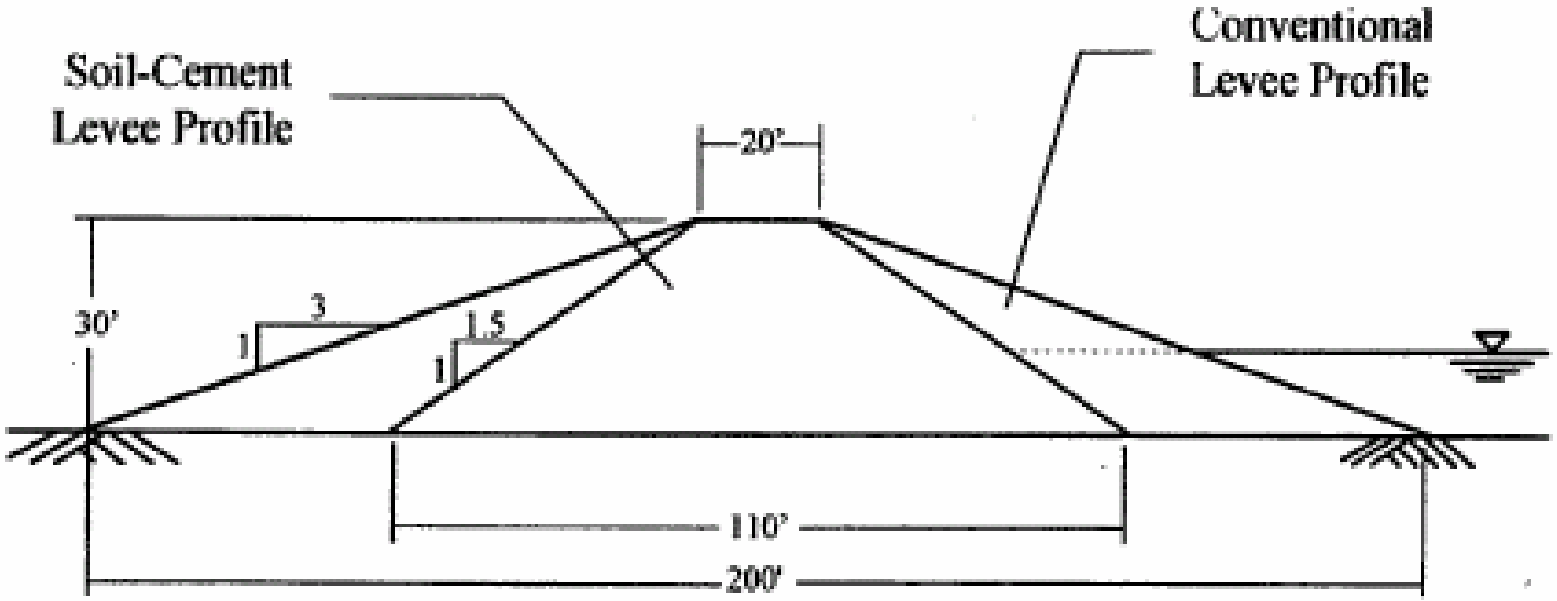
T-Wall Retaining Wall System

Source: T-Wall Brochure

Soil-Cement Levees

Flood Control Method: **SOIL-CEMENT LEVEES**

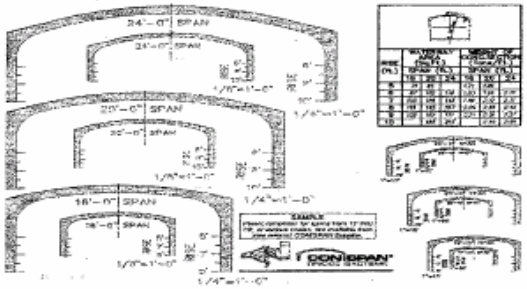
Sketch:



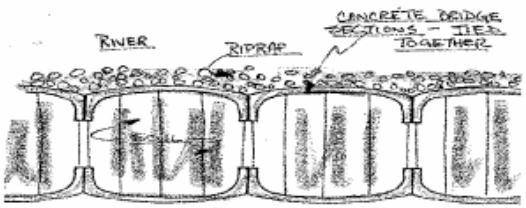
Con-Span Precast Bridge Segments Placed on Sides

Flood Control Method: CON-SPAN PRECAST BRIDGE SEGMENTS PLACED ON THEIR SIDE

Sketch:



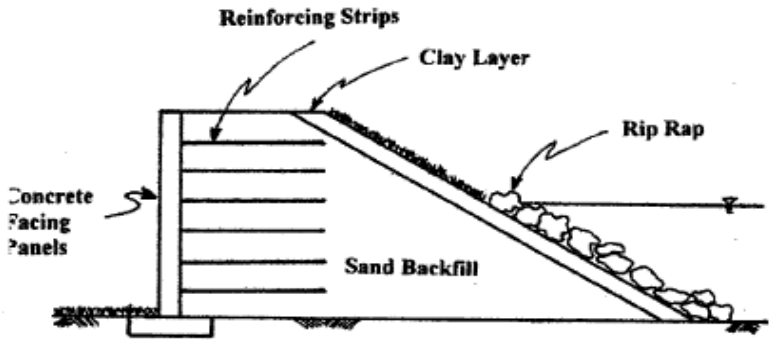
Source: Con-Span Bridge Systems Brochure



Sloped Mechanically Stabilized Earth Levees

Flood Control Method: SLOPED MECHANICALLY STABILIZED EARTH LEVEE

Sketch:

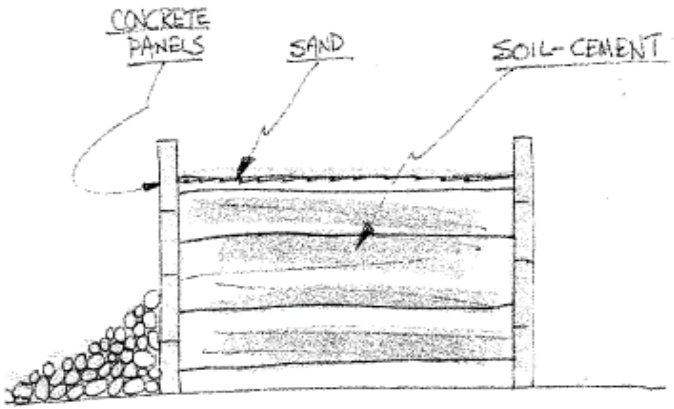


Sloped Mechanically Stabilized Earth Levee

Reinforced Earth, Panel-Faced Levees

Flood Control Method: **REINFORCED EARTH, PANEL-FACED DIKES**

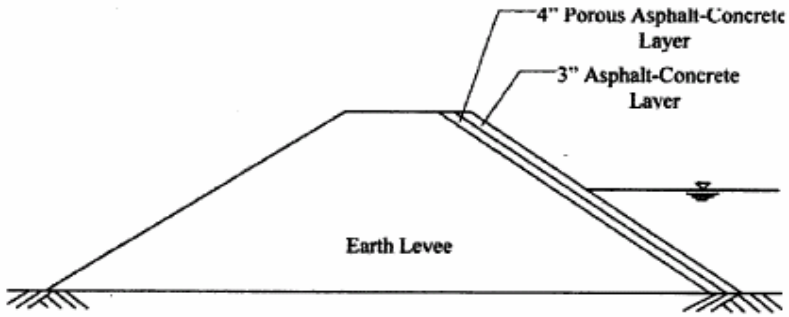
Sketch:



Asphalt Concrete-Faced Embankment Levees

Flood Control Method:	**ASPHALT CONCRETE-FACED EMBANKMENT LEVEE**
Strong Points (cont'd):	Mastic coating can be applied after placing asphalt concrete for additional decrease in permeability Most applicable when the embankment fill consists of high or uncertain permeability soils, armor material is expensive, limited construction time is available, or the importing of impermeable soil is not cost effective.
Problems:	Expensive initial cost Maintenance required Not aesthetically pleasing Limited historical use, mostly European

Sketch:

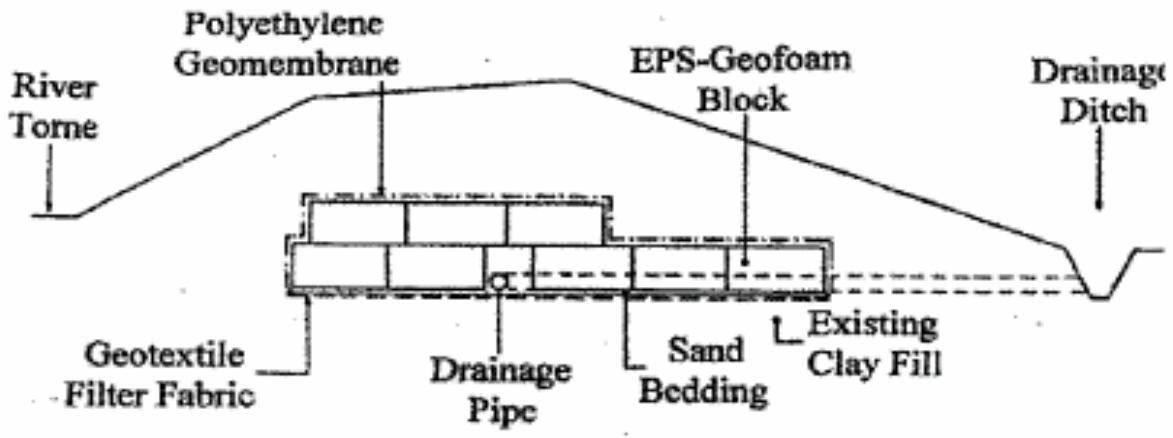


Asphalt-Concrete Faced Embankment Levee

EPS Foam-Filled Levees

Flood Control Method: **EPS FOAM-FILLED LEVEES**

Sketch:



Cross-section: River Torne Embankment

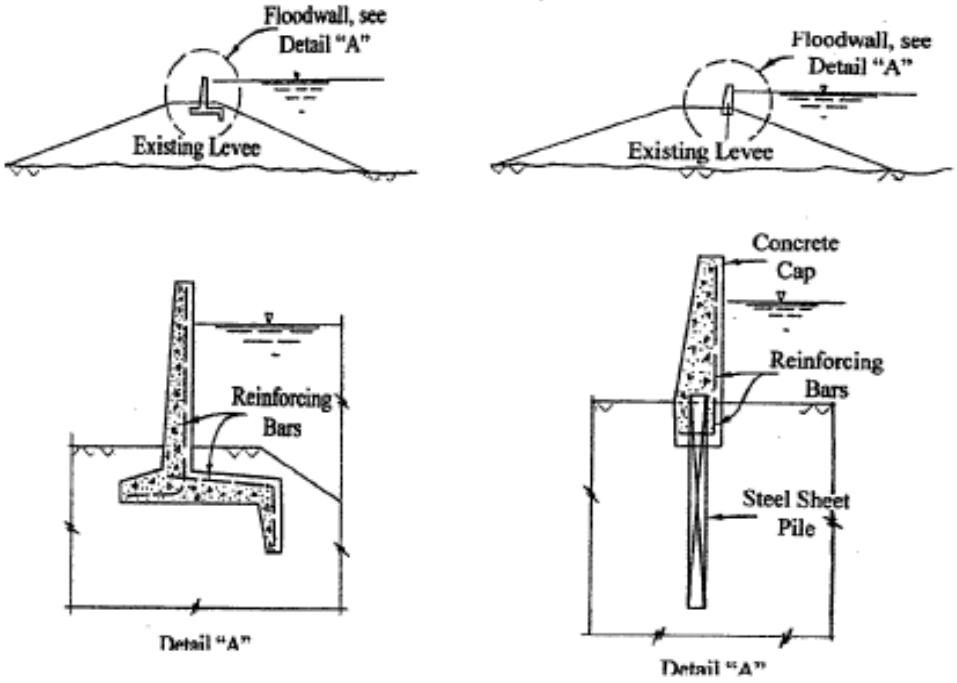
Levees Constructed with Geofoam Cores

Source: Intl Symposium on EPS Construction Method

I-walls and Inverted T-walls

Flood Control Method: **I-WALLS AND INVERTED T-WALLS**

Sketch:



T-Wall **I-Wall**

Source: U.S. Army Corps of Engineers EM 1110-2-1913